Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_ Per.: \_\_\_\_\_\_\_\_

**2.3 – Algebraic Proofs**

Properties of Equality

Reflexive Property: Any quantity is equal/congruent to itself.

Substitution Property: A quantity can be substituted for its equal.

Addition Property: When equal quantities are added to equal quantities, their sums are equal.

Subtraction Prop: When equal quantities are subtracted from equal quantities, their differences are equal.

Multiplication Prop: When equal quantities are multiplied by equal quantities, their products are equal.

Division Property: When equal quantities are divided by equal quantities, their quotients are equal.

Directions: Write an example to illustrate each property.

Reflexive Property:

Substitution Property:

Addition Property:

Subtraction Property:

Multiplication Property:

Division Property:

**1. Given:** 2*x* + 3 = 12

|  |  |
| --- | --- |
| **Statements** | **Reasons** |
| 1. 2*x* + 3 = 12 | 1. |
| 2. 2*x* = 9 | 2. |
| 3. | 3. |

**Prove:**

**2. Given**: *x* = 2 and *y* – 3*x* = 10

|  |  |
| --- | --- |
| **Statements** | **Reasons** |
| 1.  *x* = 2 | 1. |
| 2.  *y* – 3*x* = 10 | 2. |
| 3. *y* – 3(2) = 10 | 3. |
| 4. *y* – 6 = 10 | 4. |
| 5. *y* = 16 | 5. |

**Prove:** *y* = 16

Symmetric Property: If one quantity is equal to another, then the second quantity is also equal to the first quantity.

Transitive Property: If one quantity (a) is equal to another quantity (b), which is equal to another quantity (c), then the first quantity (a) is equal to the quantity value (c).

ADDITIONAL PROPERTIES OF EQUALITY

Directions: Write an example to illustrate each property.

Symmetric Property:

Transitive Property:



**Given**: 3*k* + 5 = 17

|  |  |
| --- | --- |
| **Statements** | **Reasons** |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |

**Prove**: *k* = 4

**Given:** 4(5x + 2) = 88

**Prove:** x = 4

|  |  |
| --- | --- |
| **Statements** | **Reasons** |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |

**Given:** 2*x* + 7 = 5*x* - 14

**Prove:** x = 4

|  |  |
| --- | --- |
| **Statements** | **Reasons** |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |

**Given:** 3(5*x* + 1) = 13*x* + 5

**Prove:** *x* = 1

|  |  |
| --- | --- |
| **Statements** | **Reasons** |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |

**Given**: ; *d* = 8

**Prove**: *c* = 0

|  |  |
| --- | --- |
| **Statements** | **Reasons** |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |